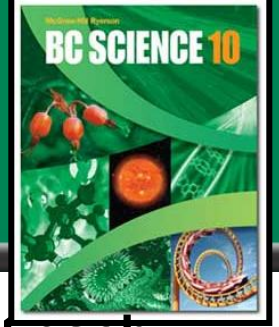
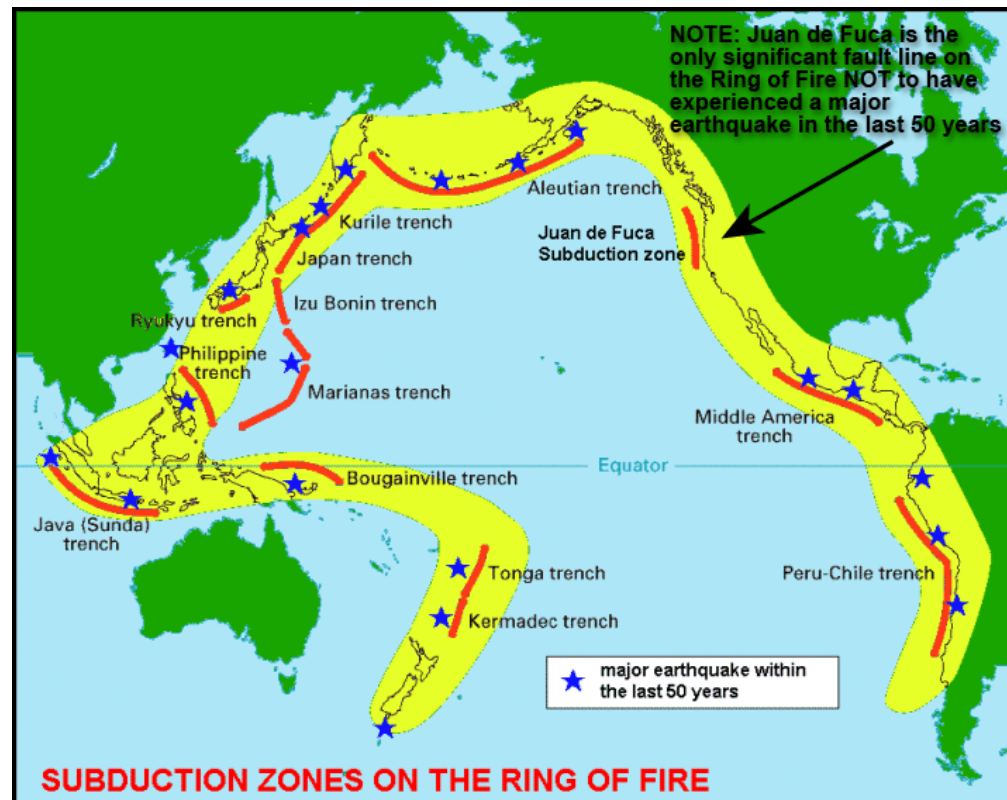


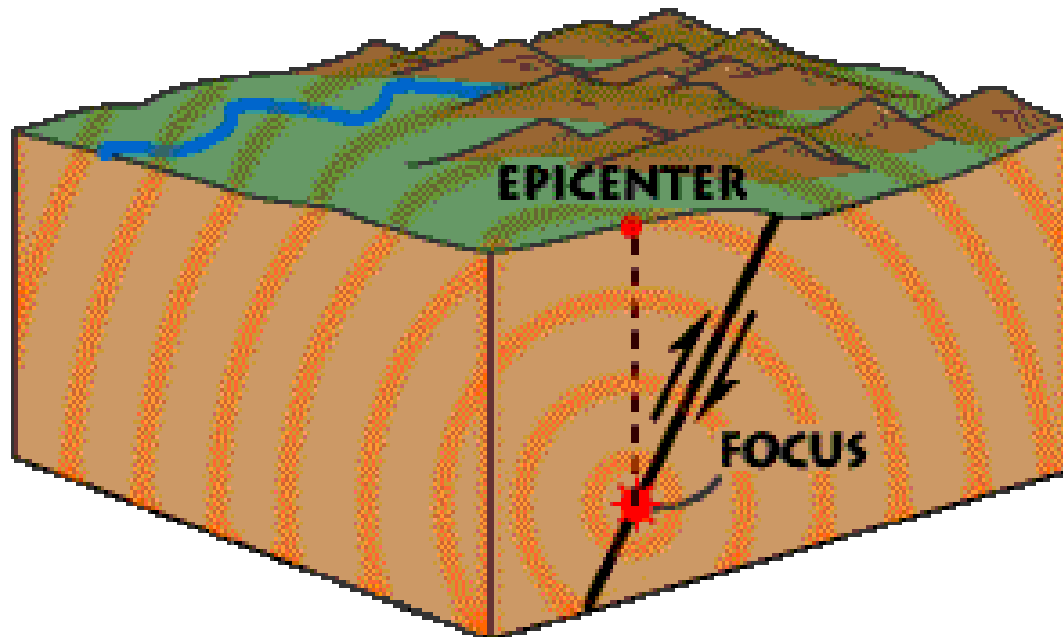
Earthquakes



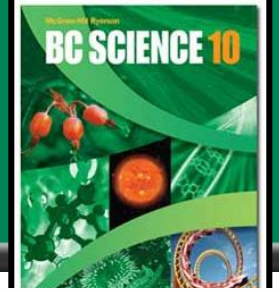
- Sometimes plates get stuck while they are pushing against each other
- They build up pressure and the release of pressure is called an **earthquake**



- The location in the Earth where the earthquake actually originates is called the **focus**
- The **epicentre** of an earthquake is the location on the **surface** of the Earth directly **above** the focus



Describing Earthquakes



- Earthquakes dangers:
 - ◆ Ground shaking, tsunami, **liquefaction** of soil
 - ◆ Occurs along plate boundaries
 - ◆ Roughly 40000 EQ worldwide/year
 - ◆ **Friction** between moving plates produce stress and
 - ◆ Release large amount of energy when plates can
 - ◆ Earthquakes occur at various depths

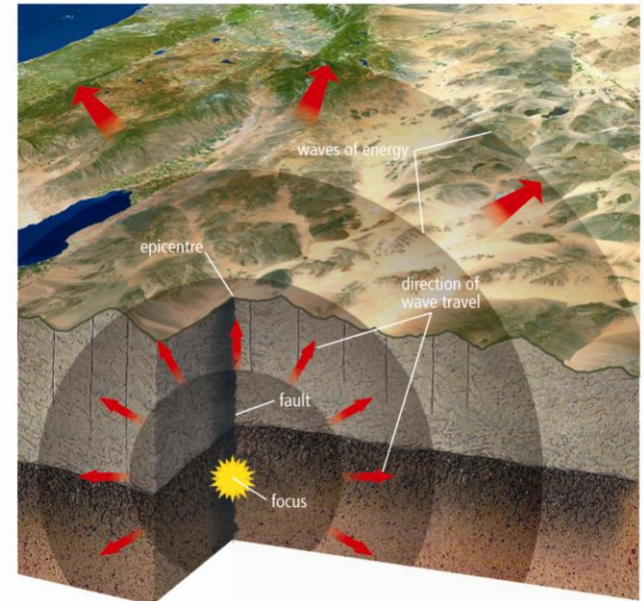
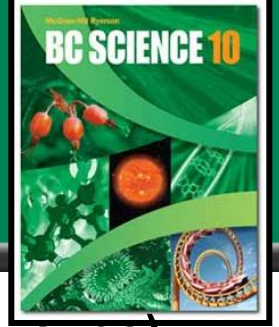


Figure 12.12 Waves of energy travel outwards from the focus of an earthquake. The epicentre of an earthquake is the point on Earth's surface directly above the focus.

Table 12.2 Depth of Origin of Earthquakes

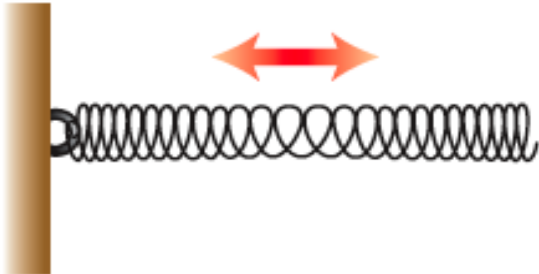
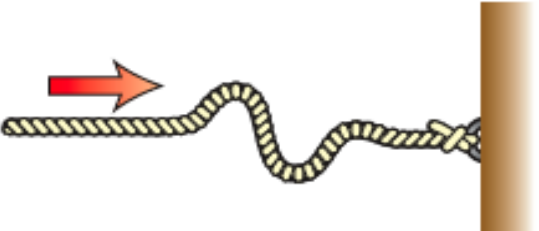

Classification	Depth of Focus
Shallow focus	0 to 70 km
Intermediate focus	70 to 300 km
Deep focus	greater than 300 km

Seismic Waves



- Earthquakes release energy in **seismic waves** (P, S and L waves)

Table 12.3 Types of Seismic Waves

Seismic Wave	Abbreviation	Description	Ground Motion
Primary wave	P	<ul style="list-style-type: none">Type of body waveFirst to arrive (fastest)Ground squeezes and stretches in direction of wave travel.Travels through solids, liquids, and gases	 A diagram illustrating a Primary (P) wave. It shows a vertical brown bar on the left representing a fixed point. A horizontal spring is attached to this bar, extending to the right. A red double-headed arrow is positioned above the spring, indicating that the ground motion is longitudinal, moving back and forth in the same direction as the wave's travel.
Secondary wave	S	<ul style="list-style-type: none">Type of body waveSecond to arrive (slower)Ground motion is perpendicular to direction of wave travel.Travels through solids but not liquids	 A diagram illustrating a Secondary (S) wave. It shows a vertical brown bar on the right representing a fixed point. A rope is attached to this bar, extending to the left. A red arrow points to the right, indicating the direction of wave travel. The rope is shown in a transverse wave pattern, moving up and down perpendicular to the direction of travel.
Surface wave	L	<ul style="list-style-type: none">Travels along Earth's surfaceLast to arrive (slowest)Ground motion is a rolling action, like ripples on a pond.	 A diagram illustrating a Surface (L) wave. It shows a 3D block representing the Earth's surface. The top surface of the block is wavy, representing the surface of the wave. Two red circular arrows are shown on the surface, indicating a rolling motion that combines both longitudinal and transverse movements.

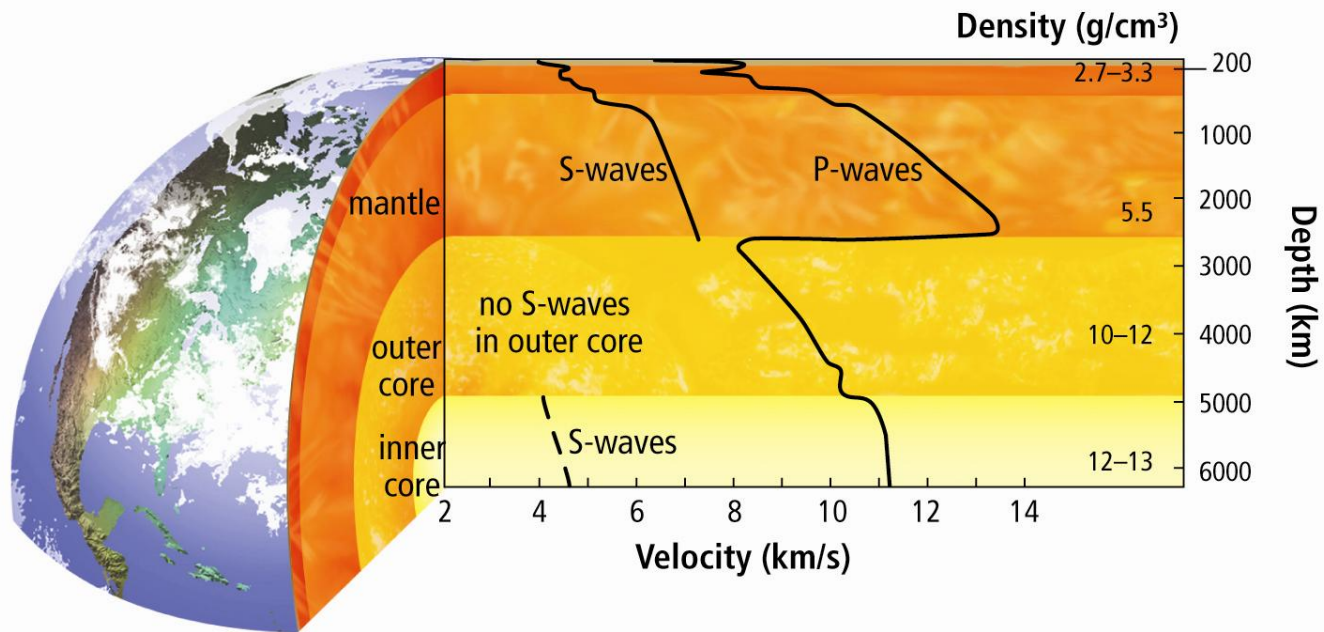
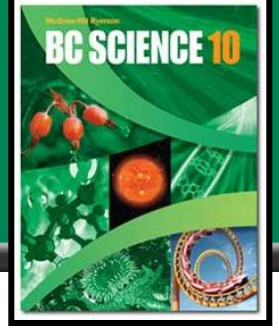
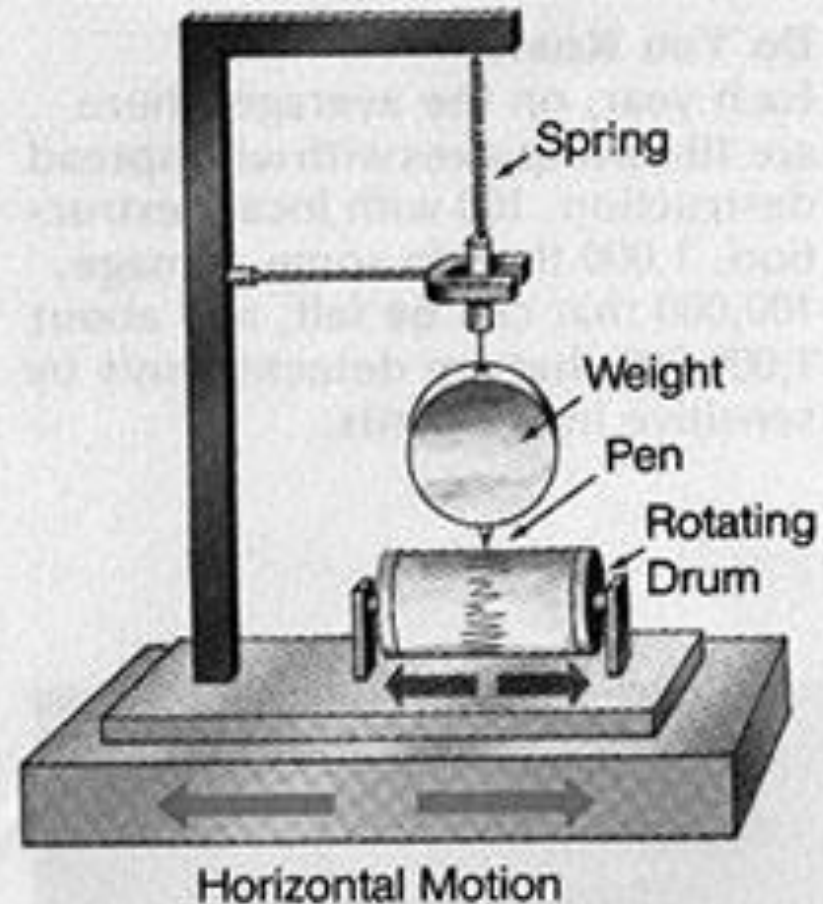


Figure 12.23 The path of seismic waves. P-waves and S-waves travel underground and are affected by the density of the material they travel through. Because L-waves travel along Earth's surface, they move more slowly than P-waves and S-waves.

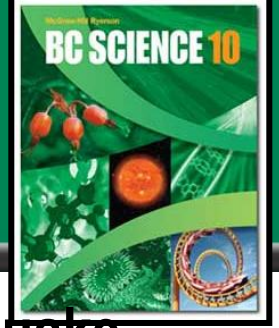
Measuring Earthquakes



- **Seismometers** (also called seismographs) is a device that measures the amount of ground motion caused by an earthquake



Describing Earthquakes (continued)



- **Magnitude is a number that rates the strength of an earthquake**
 - 1 increase in magnitude = 10X stronger
 - Since seismic waves travel at different speeds, a distance-time graph can reveal the focus.

